

### Joint Surveillance Target Attack Radar System (JSTARS) E-8C

The Joint Surveillance Target Attack Radar System (JSTARS) is a surveillance, battle management, and targeting radar system mounted on a Boeing 707 designated the E-8C. The 25-30 year old airframe has been refurbished and equipped with the JSTARS radar system, communications gear, 18 mission workstations, and an air refueling capability. It is a joint Air Force and Army program with the Air Force as the executive service. The system is required to perform surveillance and battle management for air and land component forces and is intended to meet the operational need to locate, classify, and support precision engagement of time-sensitive moving and stationary targets. Four systems combine to perform this mission: the JSTARS radar, E-8C aircraft, Army Common Ground Station (CGS), and data link connection between the two—the Surveillance and Control Data Link (SCDL). The follow-ons to the JSTARS radar, platform and data link are the Multi-Platform Radar Technology Insertion Program (MP-RTIP), Multi-sensor Command and Control Aircraft, and the Multi-Platform Common Data Link respectively. These programs are covered in a separate report.

The JSTARS program office originally planned four E-8C block upgrades. Block 10 provided the Tactical Digital Information Link; Block 20 was the Computer Replacement Program; and Block 30 integrates satellite communications, the Attack Support Upgrade, and Improved Data Modem (IDM). The Block 40 upgrade eventually transitioned to the separate MP-RTIP. Block 30 is now broken into separate efforts to upgrade the engines, avionics, and radar modes. In addition, the E-8C will be performing many of the missions previously assigned to the Airborne Battle Command and Control Center (ABCCC), which are being decommissioned.

#### TEST & EVALUATION ACTIVITIES

- Initial JSTARS IDM testing was conducted from January to April 2002. The IDM provides a sensor-to-shooter data link between the E-8C and Apache AH-64D helicopters. There were three phases of testing. Phases 1 and 2 consisted of laboratory and ground testing, respectively. Phase 3 consisted of two flight test sorties conducted during a 101<sup>st</sup> Airborne Division exercise at Fort Leonard Wood, Missouri. During the exercise, one E-8C provided threat and targeting data to three companies of Apache helicopters that were conducting deep attack operations.
- The US Army conducted an evaluation of the CGS with the 82<sup>nd</sup> Airborne Division during a rotation to the Joint Readiness Training Center at Fort Polk, Louisiana in September 2002.
- Test and Evaluation of the Block 30 upgrades is being developed and will be published in a new TEMP. This testing will include Developmental Test and Operational Test of the individual upgrades and will culminate in a dedicated Operational Test and Evaluation (OT&E) of the combined upgrades.



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#### TEST & EVALUATION ASSESSMENT

Although a Multi-Service OT&E had been originally intended for the JSTARS system, it was evaluated instead during Operation Joint Endeavor (OJE) in Bosnia. While the assessment in an operational context was valuable, it presented critical limitations to the

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scope of the evaluation because of the limited nature of the air tasking and static ground situation of OJE. As a result, only a limited capability in support of target attack and battle management was demonstrated. Because of these shortfalls and unresolved issues in Multi-Service Operational Test and Evaluation, OSD directed an E-8C Follow-on Test and Evaluation (FOT&E).

DOT&E continued to monitor JSTARS during subsequent FOT&Es, operational deployments, and exercises. The system's operational suitability has improved, but it still has not met its requirements. While the radar picture provides information on large-scale movements of ground targets over a corps-sized area and supported commanders feel it gives them a higher level of situational awareness, it is still difficult to find small-scale militarily significant (e.g., company-sized) movements. Also, the Army found the current radar does not have the potential to provide adequate information to support targeting against moving or stationary targets with indirect fire weapons systems such as artillery or Army Tactical Missile System.

Recent IDM testing demonstrated that the required targeting and surveillance messages could be transmitted in a timely and accurate manner between JSTARS E-8C and Apache AH-64D helicopters, sufficient to support target attacks by the Apache. Some operational deficiencies were noted during testing and recommendations were made to resolve these prior to equipment installation. For example, the Apache pilots could not distinguish between moving and stationary targets; those moving were incorrectly seen as stationary.

Because JSTARS was not completely tested during OJE, the future OT&E of the E-8C should be rigorous enough to evaluate the unresolved surveillance, target attack, and battle management issues identified by DOT&E. To be operationally realistic, future testing should include a full range of missions assigned to JSTARS, supporting both Army and Air Force users. The various missions should not be tested one at a time in isolation, but instead should be conducted in concert in order to evaluate workload and capacity issues. This is especially important given that the JSTARS E-8C will pick up the additional responsibility to perform many missions assigned to the Airborne Battlefield Command and Control Center.